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A NEW GENUS AND THREE NEW SPECIES OF OSTRACODS WITH A KEY TO GENUS DACTYLOCYTHERE (OSTRACODA: ENTOCYTHERIDAE)

By HORTON H. HOBBS, JR.

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A NEW GENUS AND THREE NEW SPECIES OF OSTRACODS WITH A KEY TO GENUS DACTYLOCYTHERE (OSTRACODA: ENTOCYTHERIDAE)

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The two genera treated here appear to be restricted to the eastern part of the United States. The new genus *Ornithocythere* is represented by a single species that ranges from the Dismal Swamp, Virginia, northward to the vicinity of Baltimore, Maryland, and, insofar as is known, is found only on burrowing crayfishes. The much more widely distributed *Dactylocythere* ranges from New Jersey and Kentucky southward to Alabama, where most of the species are known from the mountains, Cumberland Plateau, and the piedmont area. The range of the genus is perhaps more extensive than present records indicate, for one of the species described here is the first to be recorded from the lower coastal plain; its range extends from North Carolina to New Jersey. This ostracod, like the one mentioned above is known only from burrowing crayfishes. The third species, also a member of the genus *Dactylocythere*, is presently known from a single locality in the Greenbrier drainage system in West Virginia, where it was found on perhaps the commonest crayfish in the Appalachian Mountains, *Cambarus b. bartonii* (Fabricius).

Because no key exists to aid in the identification of the species of the genus *Dactylocythere*, an artificial one is presented as an introduction to the two members described here.

I wish to thank the following persons who have contributed specimens on which these three new species are based: Dr. Jean E. Pugh, Mr. C. W. Hart, Jr., Mr. Mark Odell, and Mr. John M. Rutherford.

Ornithocythere, new genus

Diagnosis.—Terminal tooth of mandible with cusps. Copulatory complex of male without finger guard; peniferum resembling inverted head of bird; ventral portion of peniferum with heavily sclerotized beaklike prominence directed anterodorsally; base of beak provided with subcircular aperture, through which presumably tip of penis emerges to surface. Penis complex with spermatic and prostatic portions contiguous throughout their length, not separated as in members of *Ascetocythere;* penis complex slightly longer than half anterior-posterior dimension of peniferum at level of base of penis. Clasping apparatus not clearly divisible into vertical and horizontal rami, with proximal and distal portions disposed at angle of approximately 60°; vertical ramus convex posteriorly with internal and external borders entire; horizontal ramus with external border entire and internal border with four evenly spaced teeth; ramus terminating in four denticles.

Type-species.—*Ornithocythere waltonae*, new species.

Remarks.—The most distinctive feature of this monotypic genus is the sclerotized beaklike prominence of the peniferum (see "Relationships" under *O. waltonae*).

Gender.—Feminine.

Name.—From the Greek "ornis," meaning bird, plus generic name *cythere*, alluding to the resemblance of the peniferum to the head and neck of a bird.

Ornithocythere waltonae, new species

Male.—Eye present. Shell (fig. 1*b*) highest posterior to midlength with dorsal margin tapering ventrally only slightly less suddenly anteriorly than posteriorly; ventral margin of shell entire; submarginal setae rather evenly spaced anteriorly, ventrally, and posteriorly, very few dorsally.

Copulatory complex (fig. 1*a*): As described in generic diagnosis; in addition, dorsal finger moderately slender with apex reaching level of base of penis complex; ventral finger slender and subparallel to clasping apparatus, latter extending ventrally only slightly beyond ventral margin of peniferum.

Female.—Eye present (not illustrated because destroyed in allotype). Shell of triunguis female (fig. 1*c*) distinctly larger than that of male with maximum height posterior to midlength; ventral margin of shell with distinct emargination just anterior to midlength;

submarginal setae as in male although somewhat more abundant anteriorly and posteriorly. Amiculum and J-shaped rod absent but posterodorsal area with papilla projecting into cuplike cavity containing material resembling that composing J-shaped rod of members of genus *Dactylocythere*.

MEASUREMENTS (in millimeters).—

	holotype	*males*	*allotype*	*females*
number of specimens		10		10
length (range)	0.49	0.47–0.50	0.52	0.49–0.52
average		0.49		0.51
height (range)	0.27	0.25–0.27	0.30	0.28–0.31
average		0.27		0.30

TYPE-LOCALITY.—Roadside ditch at Acerdale, 0.4 mile from junction of Great Bridge and Indian River, Princess Anne County, Virginia. Specimens removed from collection of crayfishes dug from burrows.

DISPOSITION OF TYPES.—The holotypic male, the allotypic female, and a dissected male paratype are deposited in the United States National Museum, 113472, 113473, 113474, respectively. Paratypes are in the collections of Mr. C. W. Hart, Jr., and in the joint collection of Miss Margaret Walton and the author.

RANGE.—In addition to the type-locality, *O. waltonae* is known from the following: (1) a roadside ditch across from Stumpy Lake on State Rte. 605, Virginia Beach, Princess Anne Co., Va.; (2) Landstown Road off Princess Anne Road, Virginia Beach, Princess Anne Co., Va.; (3) roadside ditch near Great Bridge, Norfolk Co., Va.; (4) Lyells, Rte. 202, Northumberland Co., Va.; (5) 2.5 mi. north of Davidsonville, Kings Branch at Sands Road, Ann Arundel Co., Md.; (6) 9.3 mi. east of Lyells, Rte. 202, Northumberland Co., Va.; (7) 6.4 mi. east of West Point on St. Rte. 14, King and Queen Co., Va.; (8) 9.5 mi. north of Surry Court House, Surry Co., Va.

HOSTS.—In the type-locality *O. waltonae* was found on *Procambarus a. acutus* (Girard) and *Cambarus d. diogenes* Girard. In all of the other localities it was found on the latter.

RELATIONSHIPS.—*Ornithocythere waltonae* seems to be most closely allied to *Okriocythere cheia* Hart (1964, p. 243) and to members of the genus *Geocythere*. The chief resemblance is in the penis complex, which consists of separated prostatic and spermatic elements. In all of these species the two elements, although distinct, are intimately associated throughout the length of the prostatic element. Somewhat more distantly related are the members of the genera *Ascetocythere* and *Plectocythere*. It differs from all of them in possessing a beaklike prominence on the antrodistal extremity of the peniferum.

OSTRACOD ASSOCIATES.—This species was associated with *Dactylocythere jeanae*, new species, in several of the localities cited above and with *Okriocythere cheia* in the Landstown locality.

NAME.—This ostracod is named in honor of my good friend and fellow student of crayfishes and entocytherid ostracods, Miss Margaret Walton.

Dactylocythere Hart

Dactylocythere Hart, 1962, Proc. Acad. Nat. Sci. Philadelphia, vol. 114, no. 3, p. 129.

With the description of the 2 new species included here, 18 species have been referred to this genus, which ranges from Kentucky and West Virginia to Alabama and from New Jersey to South Carolina. The following key will assist in the recognition of these ostracods.

Key to Species of *Dactylocythere*

1 Ventral portion of peniferum with two or more small acute projections; finger guard very slender and tridentate; clasping apparatus almost U-shaped with subterminal flare; accessory groove reduced or obsolete. **leptophylax** (Crawford, 1961, p. 238)

1′ Ventral portion of peniferum without projections; finger guard seldom slender, if tridentate, comparatively stocky; clasping apparatus variable but never with subterminal flare; accessory groove well developed 2

2(1′) Apex of clasping apparatus without denticles 3

Apex of clasping apparatus with two or more denticles 4

3(2) Clasping apparatus scythelike, sometimes with a single tooth on internal border of horizontal ramus, otherwise unadorned. **falcata** (Hobbs and Walton, 1961, p. 379)

3′ Clasping apparatus without teeth but with two or three grooves appearing to encircle distal portion of horizontal ramus. **striophylax** (Crawford, 1959, p. 157)

4(2′) Shell with posteroventral projection 18

4′ Shell without posteroventral projection 5

5(4′) Accessory groove extending dorsally much beyond level of dorsal extremity of spermatic loop 6

5′ Accessory groove never extending dorsally more than slightly beyond level or dorsal extremity of spermatic loop, sometimes not reaching loop 8

6(5) Vertical ramus of clasping apparatus distinctly arched 7

6′ Vertical ramus of clasping apparatus almost straight. **mecoscapha** (Hobbs and Walton, 1960, p. 19)

7(6) Proximal and distal ends of clasping apparatus subparallel. **prionata** (Hart and Hobbs, 1961, p. 178)

7′ Proximal and distal ends of clasping apparatus at angle of 50° to 70° to each other 19

8(5′) Dorsal margin of accessory groove not reaching spermatic loop . . 20

8′ Dorsal margin of accessory groove reaching spermatic loop, almost to or slightly beyond dorsal extremity 9

9(8′) Width of clasping apparatus at major bend more than 1.5 times least width (excluding proximal articulation) of vertical ramus 10

9′ Width of clasping apparatus at major bend less than 1.5 times least width (excluding proximal articulation) of vertical ramus 13

10(9) Horizontal ramus of clasping apparatus with one tooth on internal border . . . . . **chalaza** (Hobbs and Walton, 1962, p. 45)

10′ Horizontal ramus of clasping apparatus with more than one tooth on internal border 11

11(10′) Width of clasping apparatus at major bend less than two times least width of vertical ramus . . . . . **runki** (Hobbs, 1955, p. 330)

11′ Width of clasping apparatus at major bend more than two times least width of vertical ramus 12

12(11′) Peniferum with prominent hump on posterior margin paralleling accessory groove; posterior margin of finger guard strongly concave, distal end with single emargination.
xystroides (Hobbs and Walton, 1963, p. 460)

12′ Peniferum without prominent hump on posterior margin paralleling accessory groove; posterior margin of finger guard only slightly concave, distal end with two emarginations.
pachysphyrata (Hobbs and Walton, 1966, p. 3)

13(9′) Finger guard with three distinct distal tubercles 14

13′ Finger guard with less than three distinct distal tubercles 15

14(13) Posterodistal thickening of peniferum distinctly rounded with opening of peniferal groove directed anteriorly; apical portion of clasping apparatus serrate . . . . . **suteri** (Crawford, 1959, p. 162)

14′ Posterodistal thickening of peniferum angular with opening of peniferal groove directed anteroventrally; apical portion of clasping apparatus with teeth but not serrate . . . **chelomata** (Crawford, 1961, p. 242)

15(13′) External border of vertical ramus of clasping apparatus with angular shoulder 16

15′ External border of vertical ramus of clasping apparatus entire, rounded. 17

16(15) Internal border of horizontal ramus of clasping apparatus with four teeth, distal extremity with two . . . . . **phoxa,** new species

16′ Internal border of horizontal ramus of clasping apparatus with two teeth, distal extremity with three . . . . . **jeanae,** new species

17(15′) Vertical ramus of clasping apparatus wider than horizontal ramus, extremities directed subparallel to each other.
steevesi (Hart and Hobbs, 1961, p. 180)

17′ Vertical ramus of clasping apparatus not wider than horizontal ramus, extremities directed at angle of 35° to 50°.
ungulata (Hart and Hobbs, 1961, p. 177)

18(4) Shell with anteroventral protuberance.
amphiakis Hart and Hart (1966, p. 3)

18′ Shell without anteroventral protuberance.
daphnioides (Hobbs, 1955, p. 325)

19(7′) Three proximal teeth on internal border of horizontal ramus of clasping apparatus subequal in size and equally spaced.
arcuata (Hart and Hobbs, 1961, p. 177)

19′ Proximal tooth on internal border of horizontal ramus of clasping apparatus much larger than following two and widely separated from them.
amicula Hart and Hart (1966, p. 1)

20(8) Height of horizontal ramus of clasping apparatus at level of proximal tooth almost twice that of height at level of third tooth.
brachystrix Hobbs and Walton (1966, p. 2)

20′ Height of horizontal ramus of clasping apparatus at level of proximal tooth only slightly more than that of height at level of third tooth.
exoura Hart and Hart (1966, p. 5)

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***Dactylocythere jeanae*, new species**

MALE.—Eye present. Shell (fig. 1*h*) highest posterior to midlength, much higher posteriorly than anteriorly; ventral margin with very shallow excavation just anterior to midlength; submarginal setae present except dorsally and closer together anteriorly and posteriorly than ventrally.

Copulatory complex (fig. 1*g*): Peniferum with thickened, rounded, ventral extremity; accessory groove extending posterodorsally to level of dorsal extremity of spermatic loop; penis L-shaped with bulbous area in horizontal position and subequal in length to slender, terminal vertical portion. Finger guard essentially bifid with anterior ramus longer than posterior. Dorsal finger comparatively heavy with apical part appearing bifid (probably spatulate); ventral finger slender and gently curved to base of terminal "segment." Clasping apparatus with extensions of two rami forming angle of 60° to 80° and without thickening at their junction; vertical ramus with angular prominence just proximal to midlength of posterior surface, anterior border entire; horizontal ramus with external (ventral) border entire and internal border with two teeth on distal third; apex with three dorsodistally directed denticles.

FEMALE.—Eye present. Shell (fig. 1*i*) highest posterior to midlength and much higher posteriorly than anteriorly, ventral margin with distinct concavity anterior to midlength. Submarginal setae present except dorsally from level of eye to amiculum. Amiculum and J-shaped rod present; however, latter often resembles inverted L more than usual J.

MEASUREMENTS (in millimeters).—

	holotype	*males*	*allotype*	*females*
number of specimens		10		10
length (range)	0.50	0.46–0.51	0.56	0.49–0.56
average		0.49		0.50
height (range)	0.29	0.27–0.29	0.34	0.26–0.34
average		0.28		0.30

TYPE-LOCALITY.—Roadside ditch in Virginia Beach on Rte. 605, near Stumpy Lake, Princess Anne County, Virginia. Specimens removed from crayfishes dug from burrows.

DISPOSITION OF TYPES.—The holotypic male, and allotypic female (113475) and a dissected paratypic male (113476) are deposited in the United States National Museum. Paratypes are in the collection of Mr. C. W. Hart, Jr., and in the joint collection of Miss Margaret Walton and the author.

RANGE.—Other localities from which specimens were collected are: (1) 3.5 mi. north of Snow Hill on Rte. 258, Greene Co., N.C.; (2) Landstown Road, off Princess Anne Road, Virginia Beach, Princess

Anne Co., Va.; (3) Acerdale, Princess Anne Co., Va.; (4) 9.5 mi. north of Surry Court House, Surry Co., Va.; (5) underground spring near

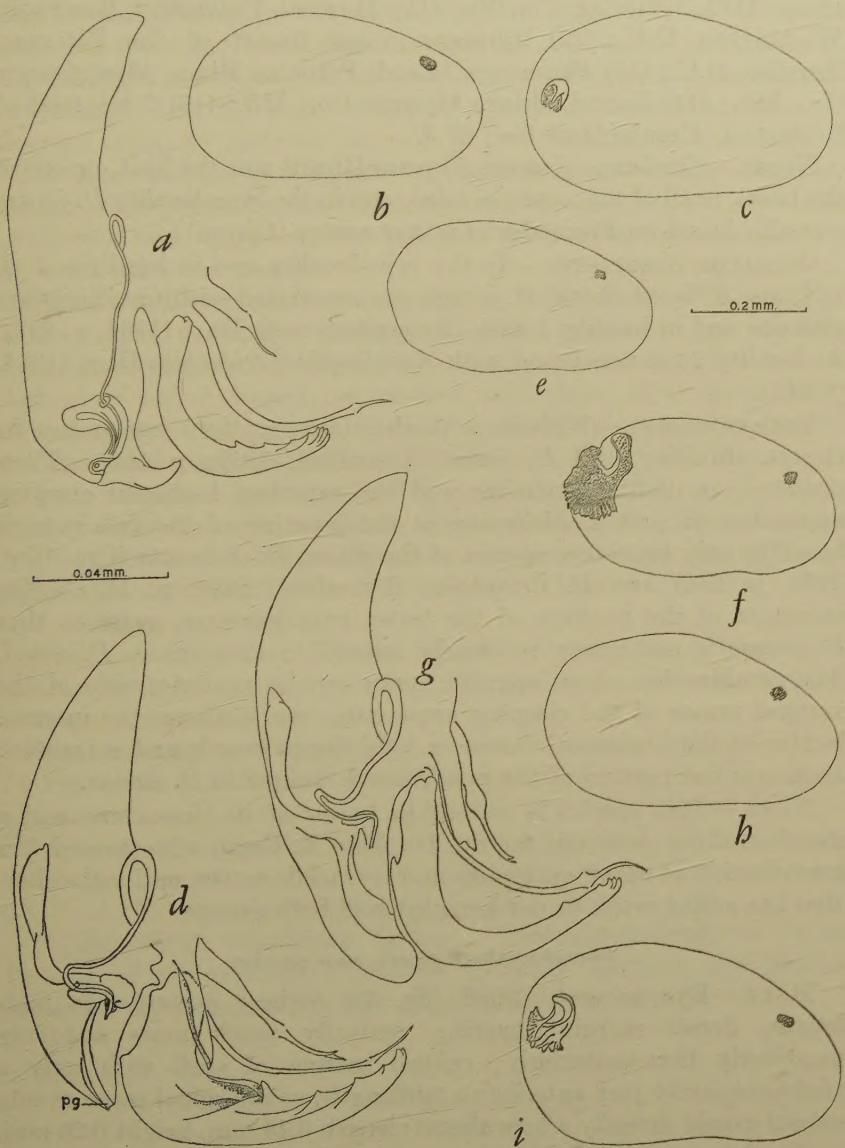

FIGURE 1.—*Ornithocythere waltonae*, new species: *a*, copulatory complex; *b*, right valve of holotype; *c*, right valve of allotype. *Dactylocythere phoxa*, new species: *d*, copulatory complex; *e*, right valve of holotype; *f*, right valve of allotype. *Dactylocythere jeanae*, new species: *g*, copulatory complex; *h*, right valve of holotype; *i*, right valve of allotype.

James River, James City Co., Va.; (6) 6.4 mi. east of West Point on St. Rte. 14, King and Queen Co., Va.; (7) backwater of South Anna

River on Rte. 22, Louisa Co., Va.; (8) Lyells, Rte. 202, Northumberland Co., Va.; (9) Seaview, Northampton Co., Va.; (10) "1 mile above D.C.," Fairfax Co., Va. (11) Howard University Reservoir, Washington, D.C.; (12) tributary to east branch of the Potomac, Burville, D.C.; (13) Plummer's Island, Potomac River, Montgomery Co., Md.; (14) Laurel, Prince Georges Co., Md.; (15) 7 mi. west of Bridgeton, Cumberland Co., N.J.

Hosts.—*Cambarus diogenes diogenes* Girard was the host, or one of the hosts, in all of the localities cited, and in the type-locality *D. jeanae* was also found on *Procambarus acutus acutus* (Girard).

Ostracod Associates.—In the type-locality and in localities 2, 3, 4, 6, and 8, listed above, *D. jeanae* was associated with *Ornithocythere waltonae* and in locality 2 with *Okriocythere cheia* Hart (1964, p. 243). At locality 13 it was found with *Ankylocythere tridentata* Hart (1964, p. 245).

Relationships.—Without a doubt, *Dactylocythere jeanae* has its closest affinities with *D. suteri* (Crawford, 1959, p. 162). Their penifera are distinctly similar and the tapering, L-shaped clasping apparatus without a thickening at the junction of the two rami is found in only two other species of the genus, *D. chelomata* (Crawford, 1961, p. 242) and *D. striophylax* (Crawford, 1959, p. 157). The structure of the penifera of the latter two, however, suggests that *D. jeanae* is not nearly so closely related to them as to *D. suteri*. The combination of an angular hump on the posterior side of the vertical ramus of the clasping apparatus, two teeth on the internal border of the horizontal ramus, a bifid finger guard, and a rounded anteroventral portion of the peniferum is unique in *D. jeanae*.

Name.—This species is named in honor of its discoverer and a member of my academic family, Dr. Jean E. Pugh, who through her contribution of many crayfishes and ostracods to the national collection has added much to our knowledge of both groups.

Dactylocythere phoxa, new species

Male.—Eye present. Shell (fig. 1*e*) highest posterior to midlength, dorsal margin tapering ventrally much more suddenly posteriorly than anteriorly; ventral margin of shell with only a slight concavity just anterior to midlength; submarginal setae evenly spaced except dorsally where absent; length 0.46 mm, height 0.26 mm.

Copulatory complex (fig. 1*d*): Peniferum with ventrally and slightly anteriorly directed subacute apex; apical portion of peniferal groove (pg) directed more strongly ventrally than that in other members of the genus, width of groove at apex about ⅛ of maximum anterior-posterior diameter of vertical ramus of clasping apparatus; accessory groove extending posterodorsally to level of dorsal extremity of sper-

matic loop; penis L-shaped, with bulbous area in horizontal plane and distinctly longer than slender vertical portion. Finger guard simple with distinct groove extending from base to distal end along posterior surface. Dorsal finger comparatively slender with bifid tip; ventral finger gently curved but with long, nearly straight portion just proximal to bulbous area. Clasping apparatus L-shaped with subangular hump at posterior junction of two rami; external borders of both rami and internal border of vertical ramus entire. Internal border of horizontal ramus with comparatively long conical tooth near midlength and three low, but pointed, teeth along distal half; apex of ramus with two teeth.

Female.—Eye present. Shell (fig. 1*f*) subreniform with proximal emargination ventrally; submarginal setae present except dorsally between levels of eye and amiculum, nowhere conspicuously abundant. Amiculum and J-shaped rod present; amiculum, although partially obscured by adhering debris, fully ruffled and extending beyond posterodorsal margin of shell; length 0.46 mm, height 0.28 mm.

Type-locality and range.—Known only from a small stream immediately east of Maxwelton, Greenbrier County, West Virginia.

Disposition of types.—The unique holotypic male and allotypic female are deposited in the United States National Museum, 113477 and 113478, respectively.

Host.—*Cambarus b. bartonii* (Fabricius) was the only crayfish present in the collection from which the type specimens were removed.

Ostracod associates.—None.

Relationships.—*Dactylocythere phoxa* is most closely related to *D. daphniodes* and *D. runki* but differs from both in possessing a short vertical ramus of the clasping apparatus, and the proximal tooth on the internal border of the horizontal ramus is conical rather than saw-toothed. The narrow, almost ventrally directed peniferal groove is not found in any other member of the genus.

Name.—From the Greek "phoxas," meaning pointed, so named because of the prominent pointed proximal tooth on the internal border of the horizontal ramus of the clasping apparatus.

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